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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,507	06/30/2003	Michael E. Badding	SP03-079	2157
22928	7590	09/07/2006		
CORNING INCORPORATED			EXAMINER	
SP-TI-3-1			WALKER, KEITH D	
CORNING, NY 14831			ART UNIT	PAPER NUMBER

1745

DATE MAILED: 09/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/611,507

Applicant(s)

BADDING ET AL.

Examiner

Keith Walker

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2006.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
4a) Of the above claim(s) 1-9 and 17-22 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 10-16 and 23-25 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Remarks

Claims 1-25 are pending in the application and claims 1-9 and 17-22 are withdrawn. Claims 10-16 and 23-25 are pending examination.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 10-16 & 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Publication 2001/0044043 (Badding) in view of US Patent 4,272,353 (Lawrance).

Regarding claims 10-14, 16 & 23, Badding teaches a yttria-stabilized zirconia electrolyte for use in a solid oxide fuel cell ([0003] & [0004]). The electrolyte is flexible and has a thickness of 5-20 microns ([0042]). Possible doping oxides for the electrolyte are selected from the group of Y, Ce, Ca, Mg, Sc, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, In, Ti, Sn, Nb, Ta, Mo, and W and mixtures thereof ([0044]).

While Badding further teaches the use of varying the sheet thickness by roughening up the electrolyte surface to improve the adhesion and reduce the resistance, he is silent as to the thickness variations and the pre-determined pattern.

For claims 10, 15 & 25, Lawrence also teaches roughening up the surface of the electrolyte to improve the adhesion. An average depth of groove from 4-10 microns varies the thickness of the electrolyte (6:65-68), with a preferred variation of 6 +/- 2 microns (7:2-5), which when applied to the Badding electrolyte gives a variation in thickness of 20% - 80%. A pre-determined crosshatched pattern is produced on the electrolyte surface (12:5-10). The motivation to use the roughened surface with the electrolyte is to provide a better adhesive surface for the electrolyte.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the roughened electrolyte of Badding with the electrolyte of varying thickness to improve the adhesive property of the electrolyte and improve the connection between the electrode and the electrolyte.

Furthermore, the ohmic resistance of the electrolytic sheet is an inherent characteristic of the materials and design. Since the electrolytic sheet is made from the same materials and has the same features as the instant claims, the electrolytic sheet as taught by Badding in view of Lawrence would have an equivalent ohmic resistance as applicant.

2. Claims 10-16 & 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Publication 2003/0180602 (Finn).

Regarding claims 10-15, 23 & 24, Finn teaches a solid oxide fuel cell with a textured electrolyte made with yttria-stabilized zirconia ceramic. The surface has a plurality of protrusions having a height less than 5% the average thickness of the electrolyte. The surface roughness is 0.5 – 2.5 microns, which gives an average

electrolyte thickness of 10 – 50 microns ([0175] & [0177]). A predetermined pattern is used to texture the electrolyte sheet (Figs 13, 15, 16; [0186]).

Regarding claim 16 & 23-24, since the electrolyte layer is made from the same material and has the same thickness and features, it is inherent that it would have the same flexible property and an equivalent ohmic resistance as applicant.

The precise combination of a thickness variation of at least 2 microns and an average thickness between 3 and 30 microns is not taught. With a height variation of less than 5% as taught by Finn and a thickness variation of 2 microns as required by the claim, the average thickness of the electrolytic sheet is 40 microns. However, both the surface roughness and the thickness of the electrolyte sheet taught by Finn encompass the claimed parameters of the instant application and it would be obvious to one skilled in the art to optimize the thickness of the sheet to balance the resistance of the sheet with the strength of the sheet and to optimize the surface roughness to promote the best adhesion characteristics. Discovery of optimum of result effective variable in known process is ordinarily within the skill of art. Claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result, which is different in kind and not merely in degree from the results of the prior art (MPEP 2144.08).

Response to Arguments

Applicant's arguments filed 6/26/06 have been fully considered but they are not persuasive. Applicants argue the combination of the Lawrence reference with the Badding reference is not proper and does not produce the instant application since

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Badding already teaches roughening of the surface thus the addition of Lawrence would not be needed. As stated above, since Badding does not disclose the parameters of roughening, one would look to Lawrence, who also roughens the surface of the electrolyte, hence a similar act for similar reasons and therefore analogous art, to teach the amount of roughening or variation of thickness of the electrolyte. Both references teach the roughening of an electrolyte to improve the adhesion; this provides the reasoned support for the two references being analogous art in this manner.

To use the applicant's analogy of relevancy between automobiles and airplanes, would one skilled in the art of airplanes look to a car to solve a lifter or landing gear problem, no. However, one skilled in the art of airplanes might look to automobiles to improve control systems, IC cards, seat belts, inside lighting for the cabin or display systems all of which both transportation means have in common. In a similar manner, in the fuel cell art one might look to other type fuel cells to solve similar problems such as adhesion. Furthermore, the roughening of surfaces to improve the bonding adhesion is a well-known principle in many arts, painting and metal work to name a couple.

As stated above, Badding teaches roughening the surface to improve the adhesion and reduce the resistance, the same reasons as the applicant. It would be obvious to one skilled in the art to look at a reference such as Lawrence, which teaches the same process of roughening an electrolyte surface to improve the bonding adhesion, to learn how much the surfaces should be roughened.

Applicant asserts "one of skill in the art would recognize that sanding a SOFC electrolyte...with a thickness of 30 microns or smaller will result in fracture of the

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electrolyte..." However, the applicant gives no support for this assertion. Also, it is unclear how the finer sandpaper of 400 grit would have larger particle sizes than the more coarse grit of 150. With respect to the arguments above, it is unclear how Lawrence teaches away from the instant invention, since both references teach a roughening of the surfaces of the electrolyte for the same reason, which is shared by the applicant.

Applicant argues since the electrolytic sheet taught by Badding and Lawrence does not have the same structure it would not have the same ohmic resistance. It is held that the electrolytic sheet of Badding and Lawrence is the same as the applicant's instant invention and since the ohmic resistance is a function of the material and the features, which has not been argued by the applicant, the ohmic resistance is the same as the instant claim. Lawrence teaches a preferable thickness variation of 6 ± 2 microns, which when applied to the Badding electrolyte gives a variation in thickness of 20% - 80%.

Applicant argues the Finn reference does not meet the limitations of the claimed invention since the thickness variation is less than 5% and the new limitation of the claimed invention is 6.6% -90%. It is held that claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result, which is different in kind and not merely in degree from the results of the prior art (MPEP 2144.08).

Applicant argues the motivation statement " it would be obvious to optimize the thickness of the sheet to balance the resistance of the sheet with a strength of the

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sheet” is hindsight reasoning that is not provided by the Finn reference. One skilled in the art would understand the basic material science application that making something thicker makes it stronger but can also increase the conductivity through the material. Furthermore, as evidence to support the statement, the reference of Badding teaches, “the electrolyte resistance depends on material properties and geometry and is proportional to the thickness of the electrolyte.” ([0041]). Therefore, hindsight reasoning was not applied and the claims are considered obvious over the teachings of Finn.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keith Walker whose telephone number is 571-272-3458. The examiner can normally be reached on Mon. - Fri. 8am - 5pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

K. Walker


PATRICK JOSEPH RYAN
SUPERVISORY EXAMINER